July 28, 2010

Innovation and Economic Prosperity

Presentation at the

Science, Technology and Innovation: Imperatives for National and Economic Security conference Conference

Dr. Robert Atkinson

President

Information Technology and Innovation Foundation

ITIF is public policy think tank committed to articulating and advancing a pro-productivity and pro-innovation policy agenda internationally, in Washington and in the states. ITIF focuses on:

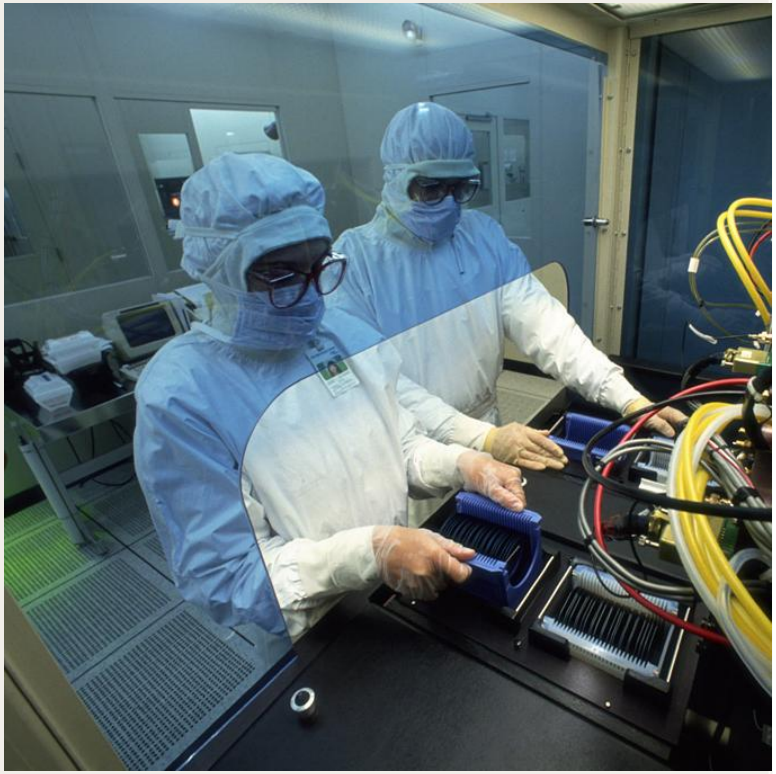
- Innovation processes, policy and metrics
- Science policy related to economic growth
- Digital transformation (E-commerce, e-government, e-health, etc.)
- ICT and economic productivity
- Innovation and trade policy

Today's Presentation

1. **Why Does Innovation Matter?**
2. **The Changing Nature of Innovation**
3. **Benchmarking International Innovation**
4. **Explanations (Excuses) for our Decline**
5. **Innovation Policies**

This is Innovation

Innovation in "tradable" new products and services is critical for regional economic growth.



So Is This

- John Deere CEO Bob Lane says he doesn't make tractors but rather "sophisticated mobile information factories."

- GPS shows where it is
- Microwave sensors measure cotton flow
- RFID tags let processors know origin of each bundle
- Wireless communications
- Computing power of 8 PC's

Why Does Innovation Matter?

Because it drives economic growth:

- The private return to U.S. R&D is 7% while the societal RoR is 30%, suggesting that the optimal level of R&D investment is between two to four times larger than the total current level of private investment. (Jones and Williams, 2000)
- Every 1% increase in the stock of research increased productivity by 0.23 percent. (Coe and Helpman, 1995)
- At least 2/3 of increase in per-capita GDP is attributable to innovation.

Why Does Innovation Matter?

- Because economic transformation is constant and innovation is required to continually renew a region's economy.

The essential point to grasp is that in dealing with capitalism we are dealing with an evolutionary process... the fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates."

(Joseph Schumpeter, Capitalism, Socialism and Democracy, 1942)

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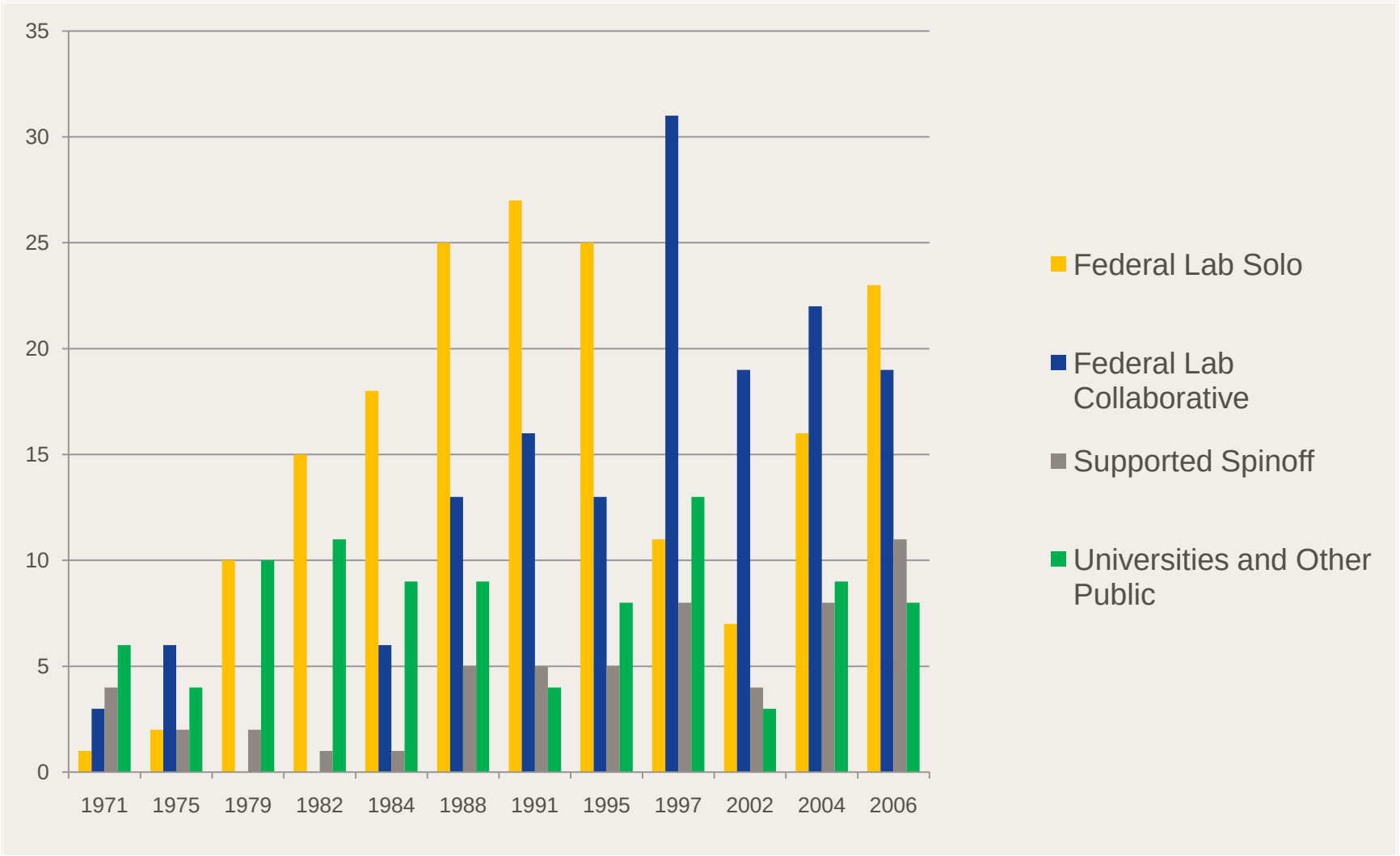
The U.S. Innovation System Has Become More Collaborative

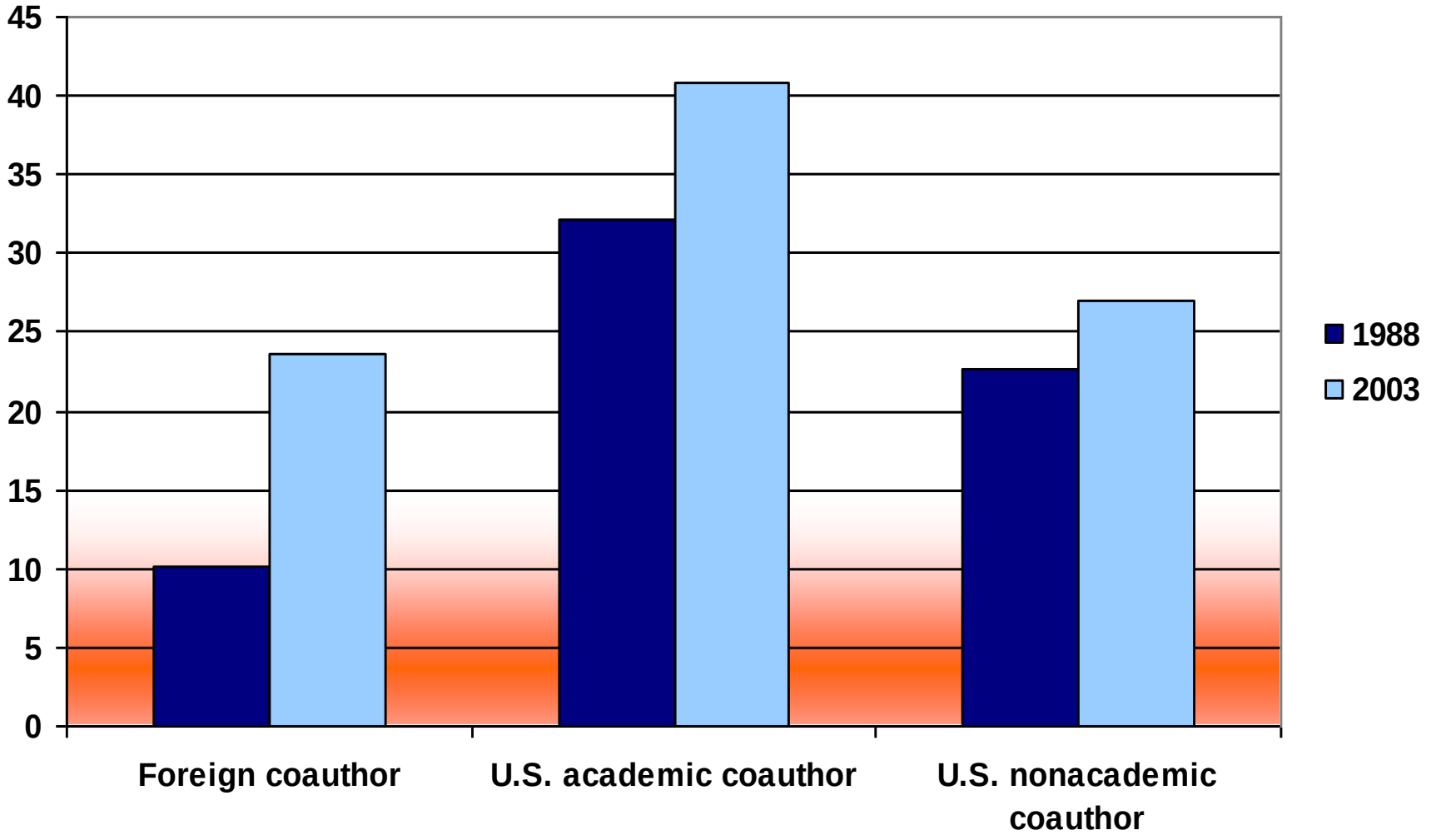
Source: Fred Block and Michael Keller, "Where Do Innovations Come From? Transformations in the U.S. National Innovation System, 1970-2006, (ITIF, 2008).

Federal Labs vs. Spinoffs vs. Other Public, Number of Awards



Source: Fred Block and Michael Keller, "Where Do Innovations Come From? Transformations in the U.S. National Innovation System, 1970-2006, (ITIF, 2008).

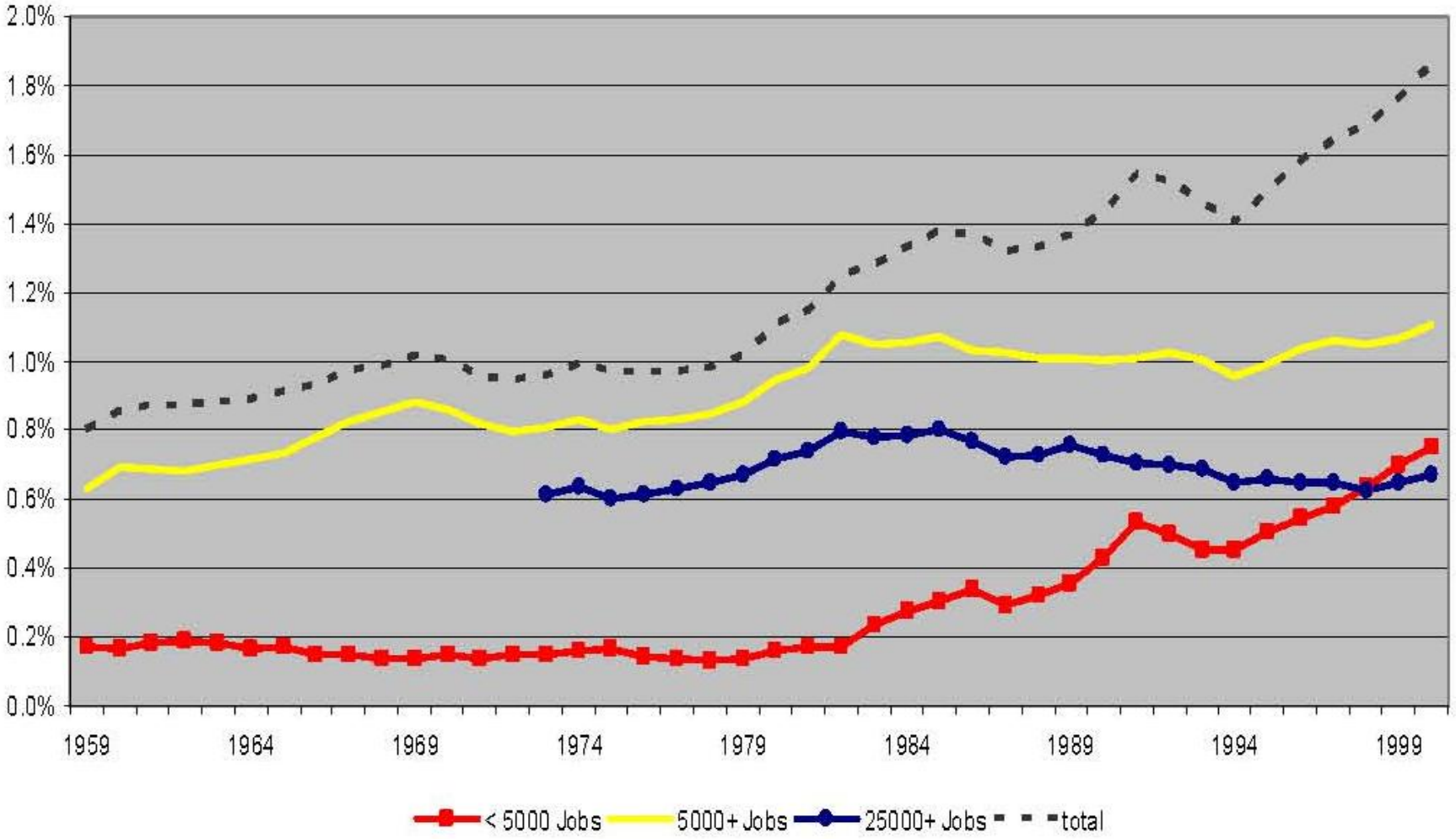
International Collaboration is Growing



Source: National Science Foundation, *Science and Engineering Indicators 2006, Figure 5-52*, <www.nsf.gov/statistics/seind06/c5/fig05-52.htm>

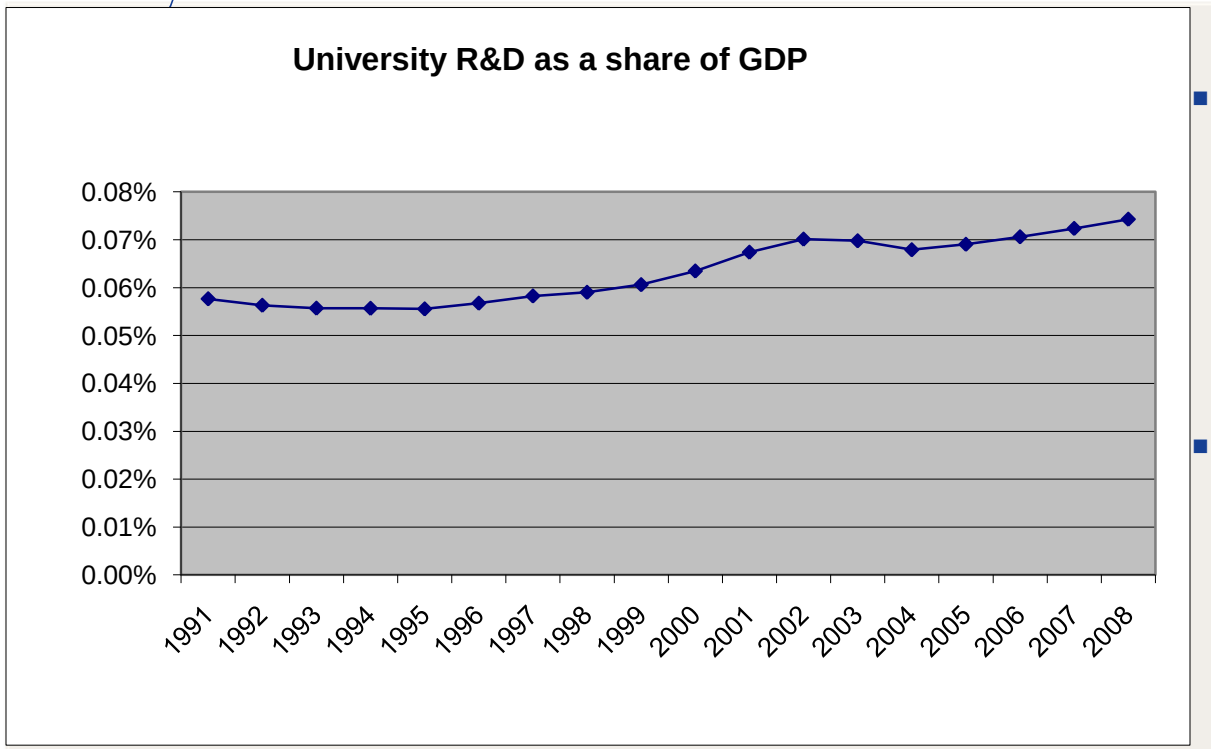
Small and Mid-Sized Firms are Becoming a More Important Source of Innovation

(R&D by firm Size as % of GDP)



Source: Robert M. Hunt and Leonard I. Nakamura, "The Democratization of U.S. Research and Development after 1980," Research Department Federal Reserve Bank of Philadelphia (Jan. 2006), 19.

Universities are Becoming More Important Player in the Innovation Process



- Annual patent applications filed from universities increased from 7,200 in 2003 to 11,000 in 2007.
- Between 2003 and 2007 the number of revenue generating licenses in universities increased by 39 percent and were worth $1.9 billion.
- New start-ups formed increased from 212 in 1994, to 348 in 2003 and 510 in 2007.

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THE ATLANTIC CENTURY

Benchmarking EU & U.S. Innovation and Competitiveness

Robert D. Atkinson and Scott Andes
The Information Technology and Innovation Foundation
Washington, D.C.

February 2009

European-American Business Council

The Information Technology & Innovation Foundation
ITIF

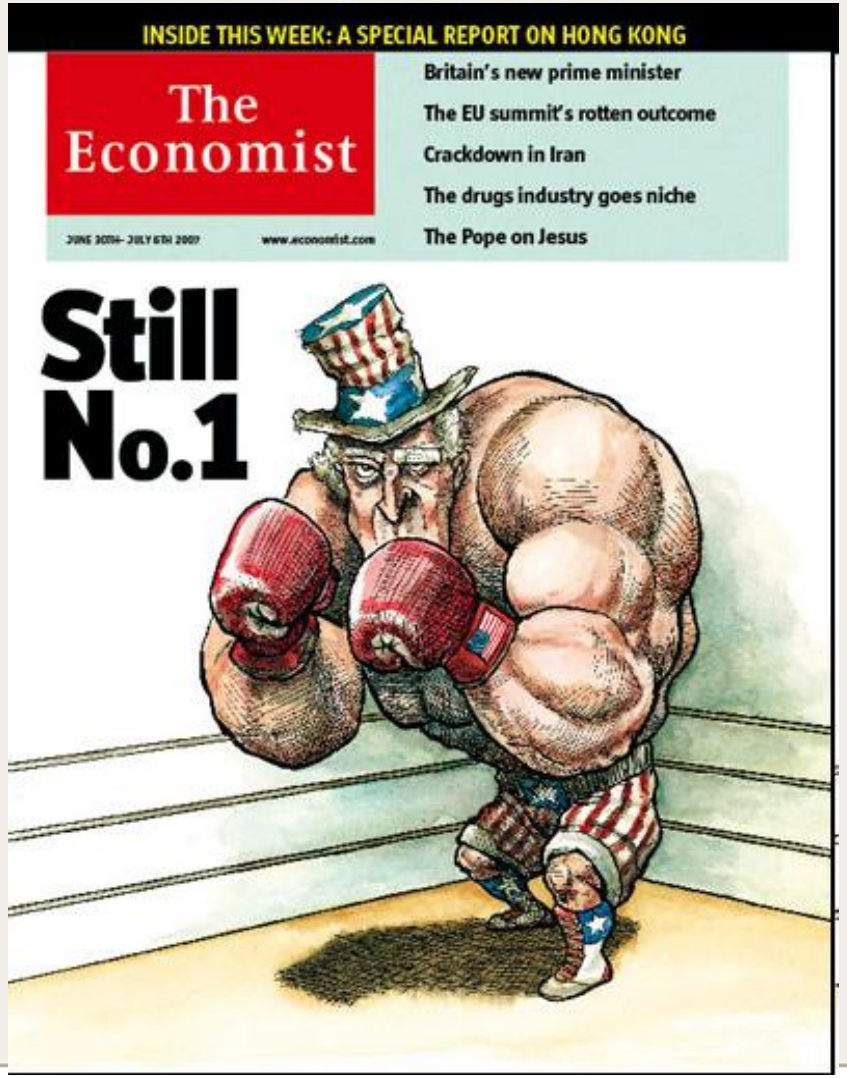
The Atlantic Century Study

- **The Study:** comparing innovation-based competiveness of 40 nations and regions.
- **Countries:** EU and NAFTA countries, Australia, Brazil, China, India, Japan, South Korea, Russia, and Singapore
- **Regions:** EU-10, EU-15, EU-25, and NAFTA

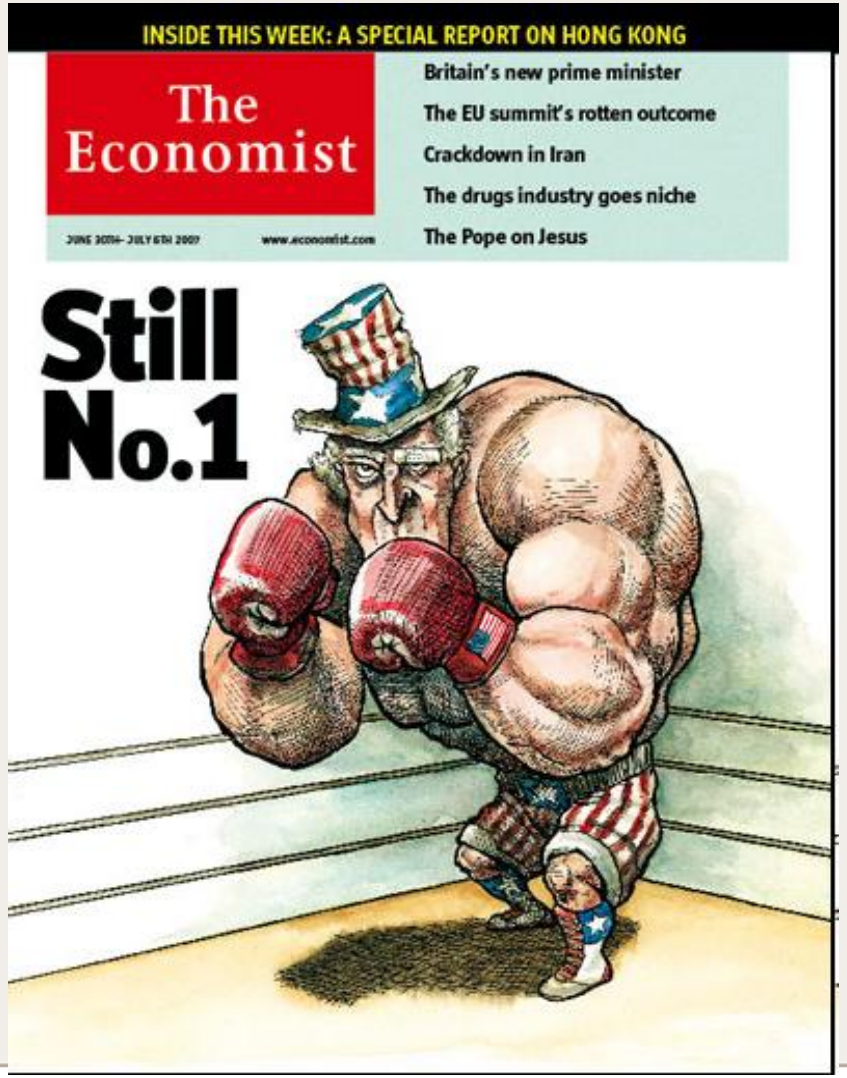
6 Groups of 16 Indicators to Assess Global Innovation-based Competitiveness:

- Economic Structure
  - Human capital (college education; researchers)
  - Innovation capacity (corporate R&D; government R&D; scientific publications)
  - Entrepreneurship (new firms; venture capital)
  - IT infrastructure (e-government; corporate IT investment; broadband)
- Economic Policy (corp. tax; ease of doing business)
- Economic Performance (trade balance, FDI, GDP per worker, productivity)

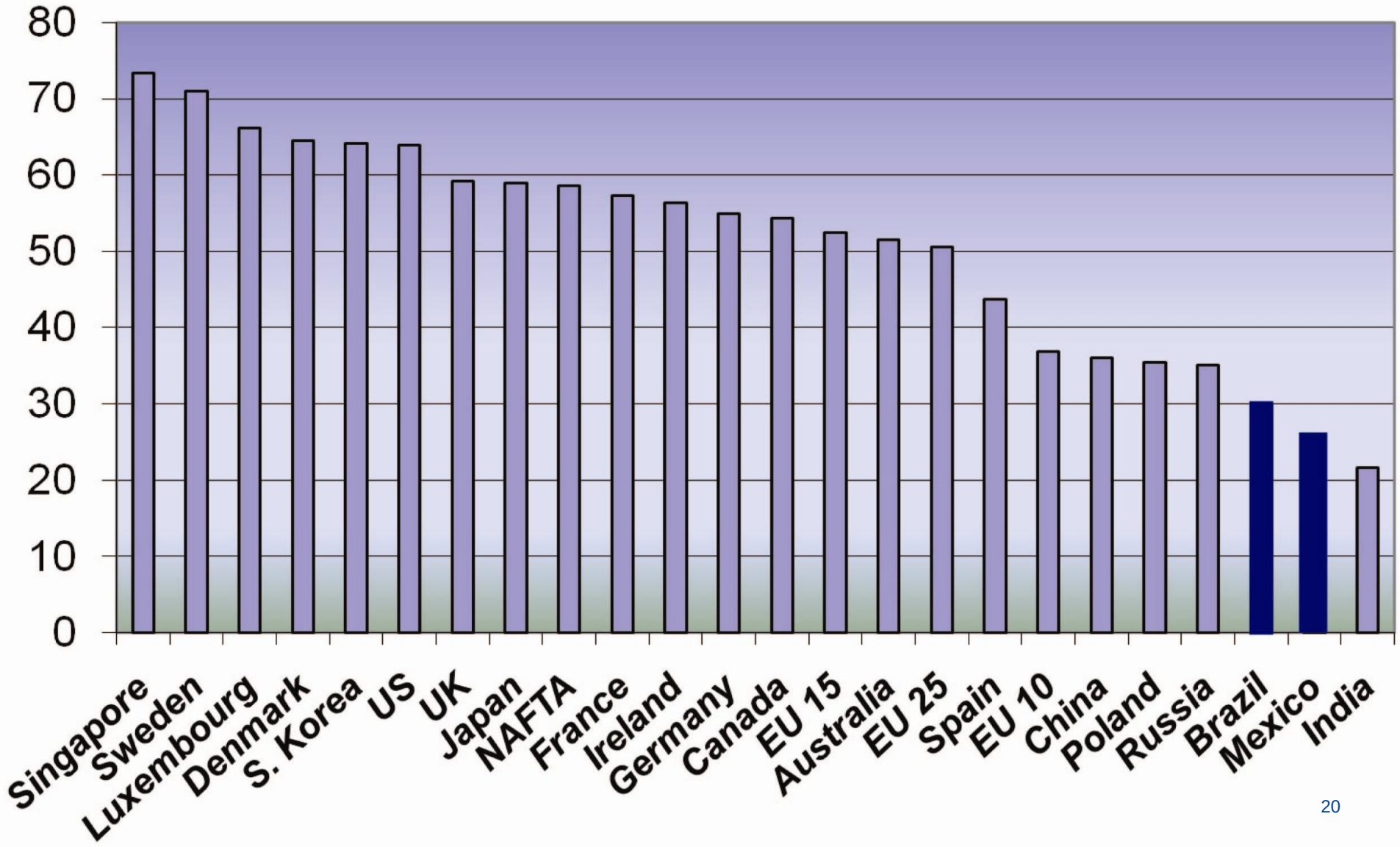
We're Number 1?



Actually, We're Number 6



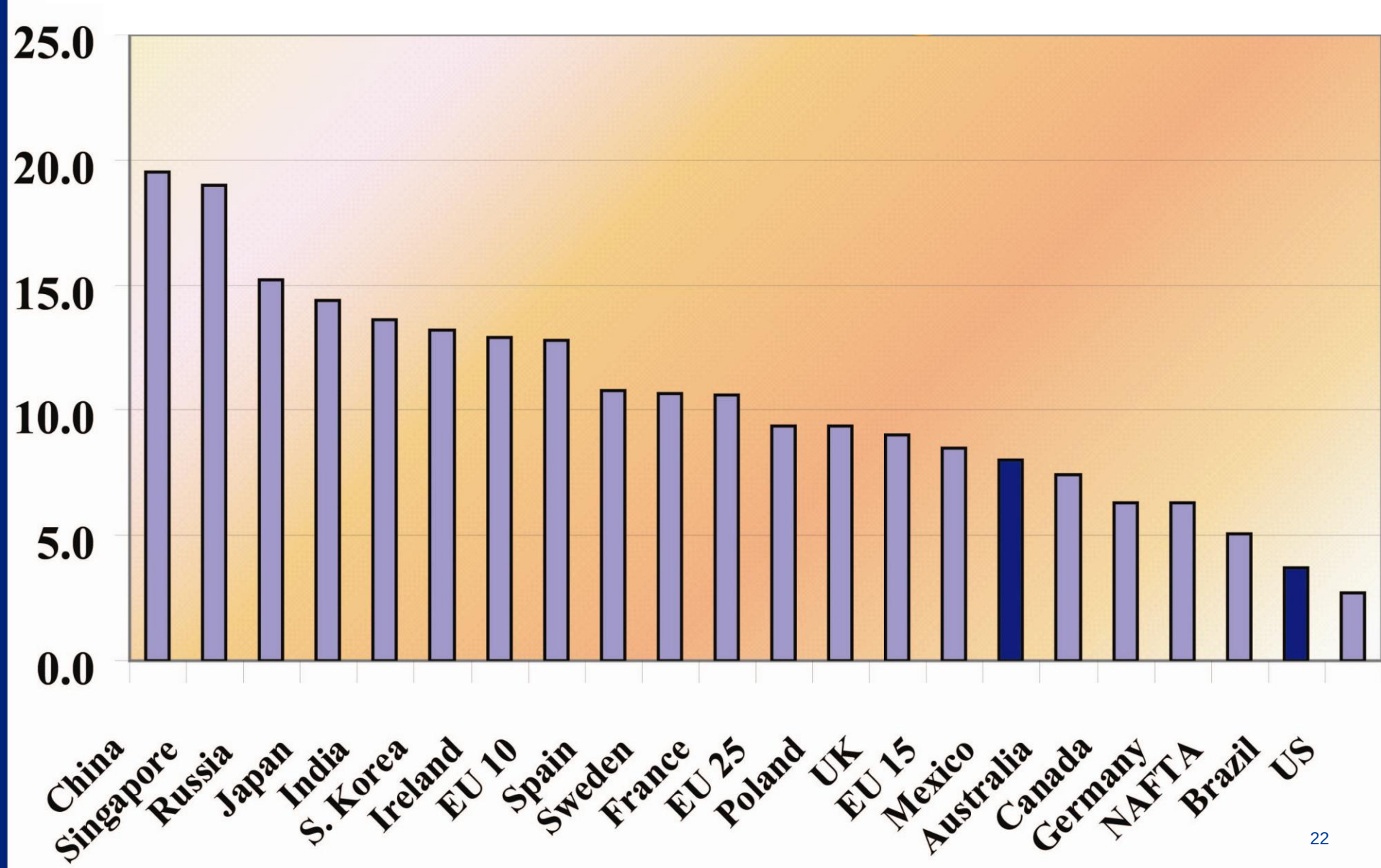
Overall Score



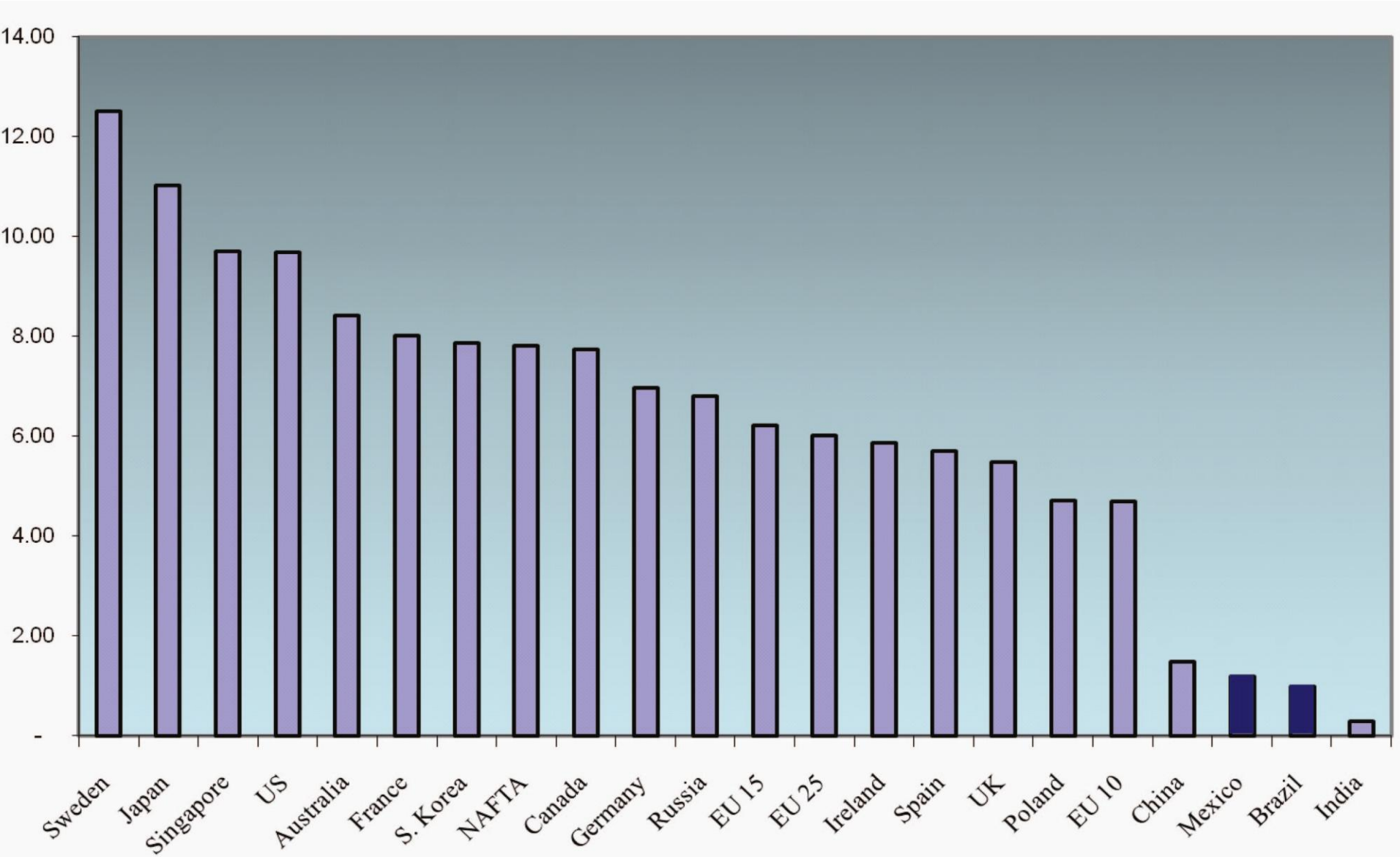
The U.S. is Behind….

1. China
2. Singapore
3. Estonia
4. Denmark
5. Luxembourg
6. Slovenia
7. Russia
8. Lithuania
9. Cyprus
10. Japan
11. Hungary
12. Slovakia
13. Czech Republic
14. India
15. Latvia
16. Austria
17. S. Korea
18. Ireland
19. EU-10
20. Spain
21. Sweden
22. France
23. Portugal
24. Malta
25. Belgium
26. EU-25
27. Poland
28. UK
29. EU-15
30. Mexico
31. Netherlands
32. Australia
33. Finland
34. Canada
35. Germany
36. Italy
37. NAFTA
38. Greece
39. Brazil
40. United States

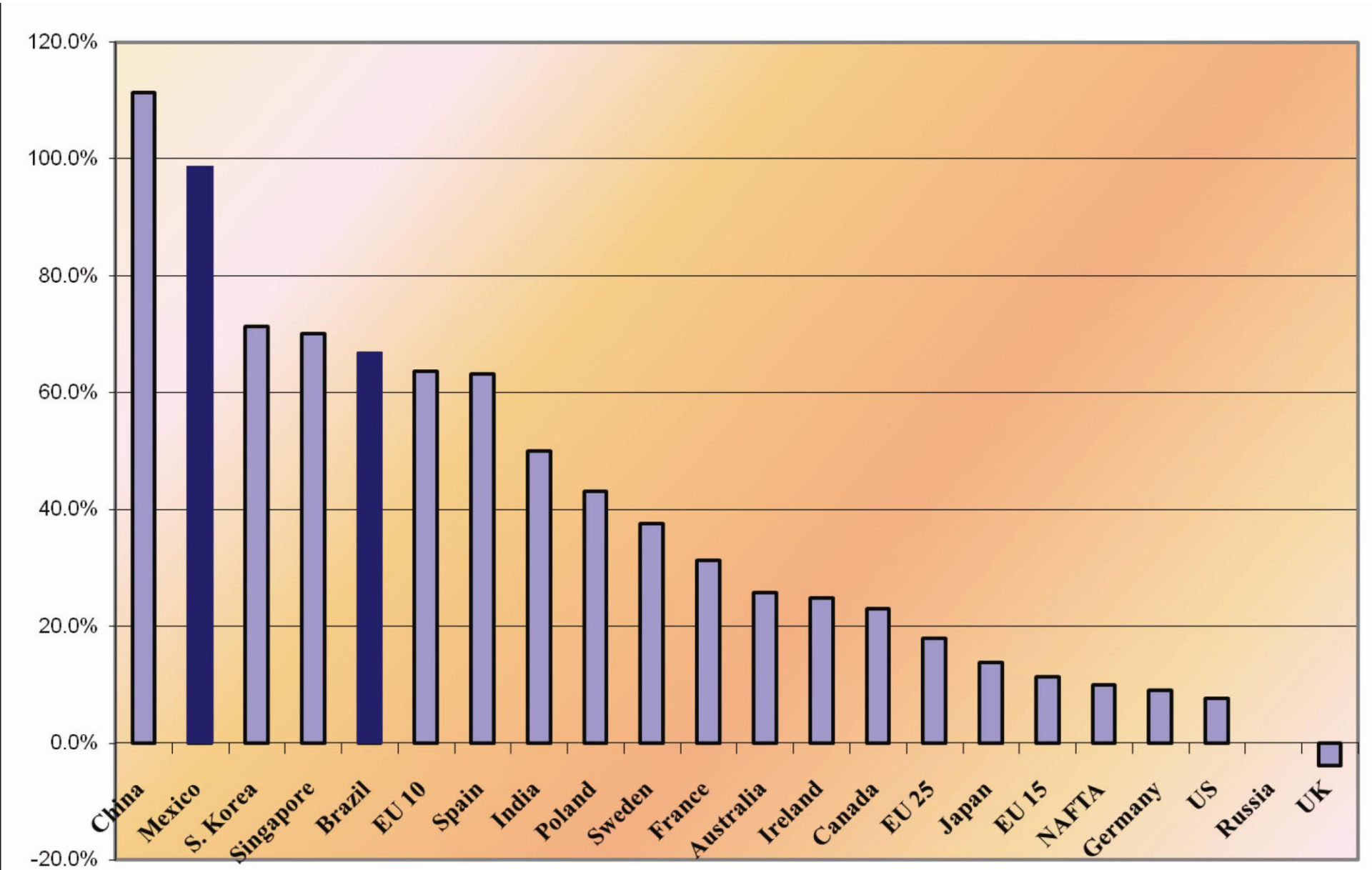
Overall Change



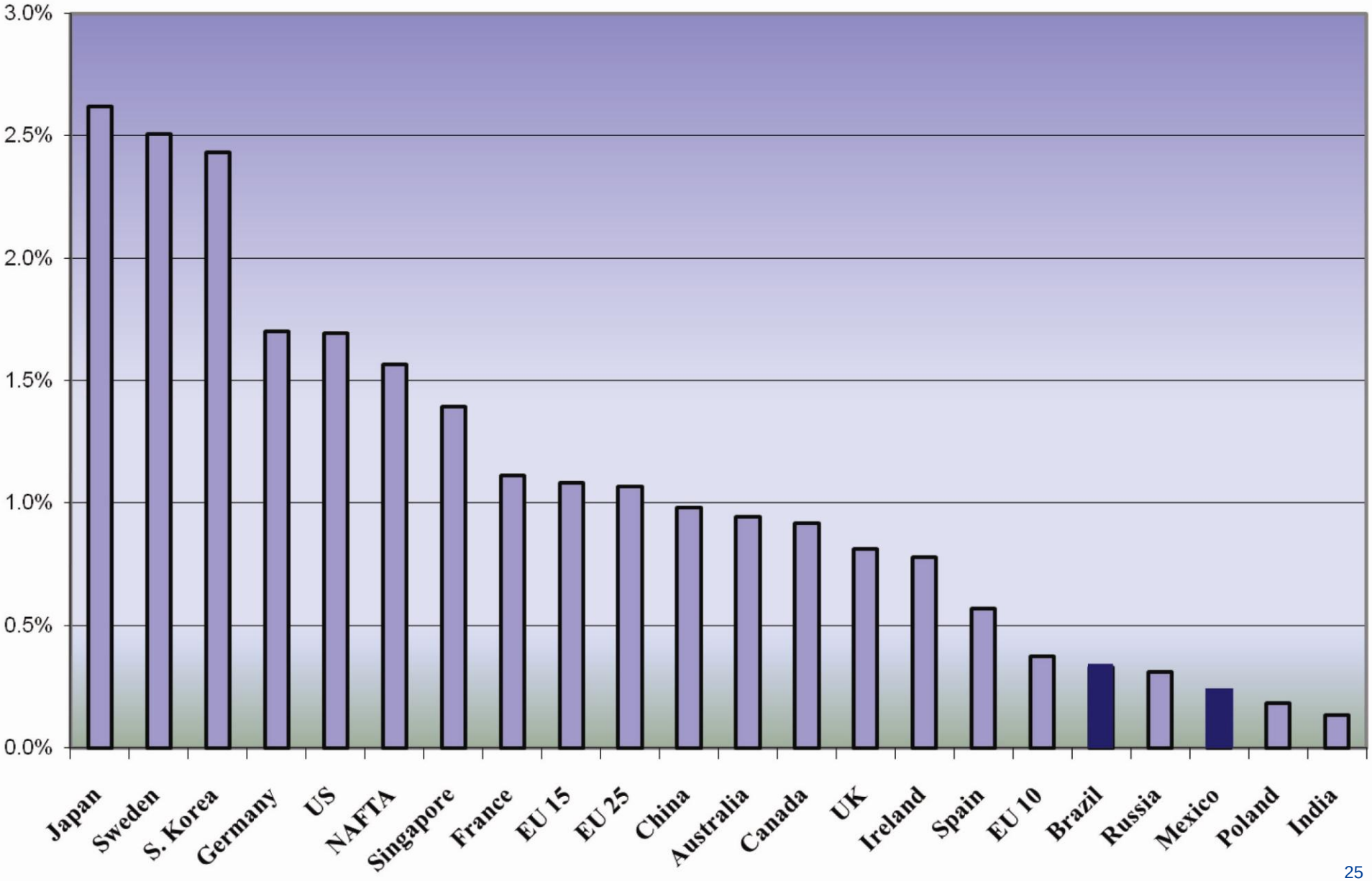
Researchers



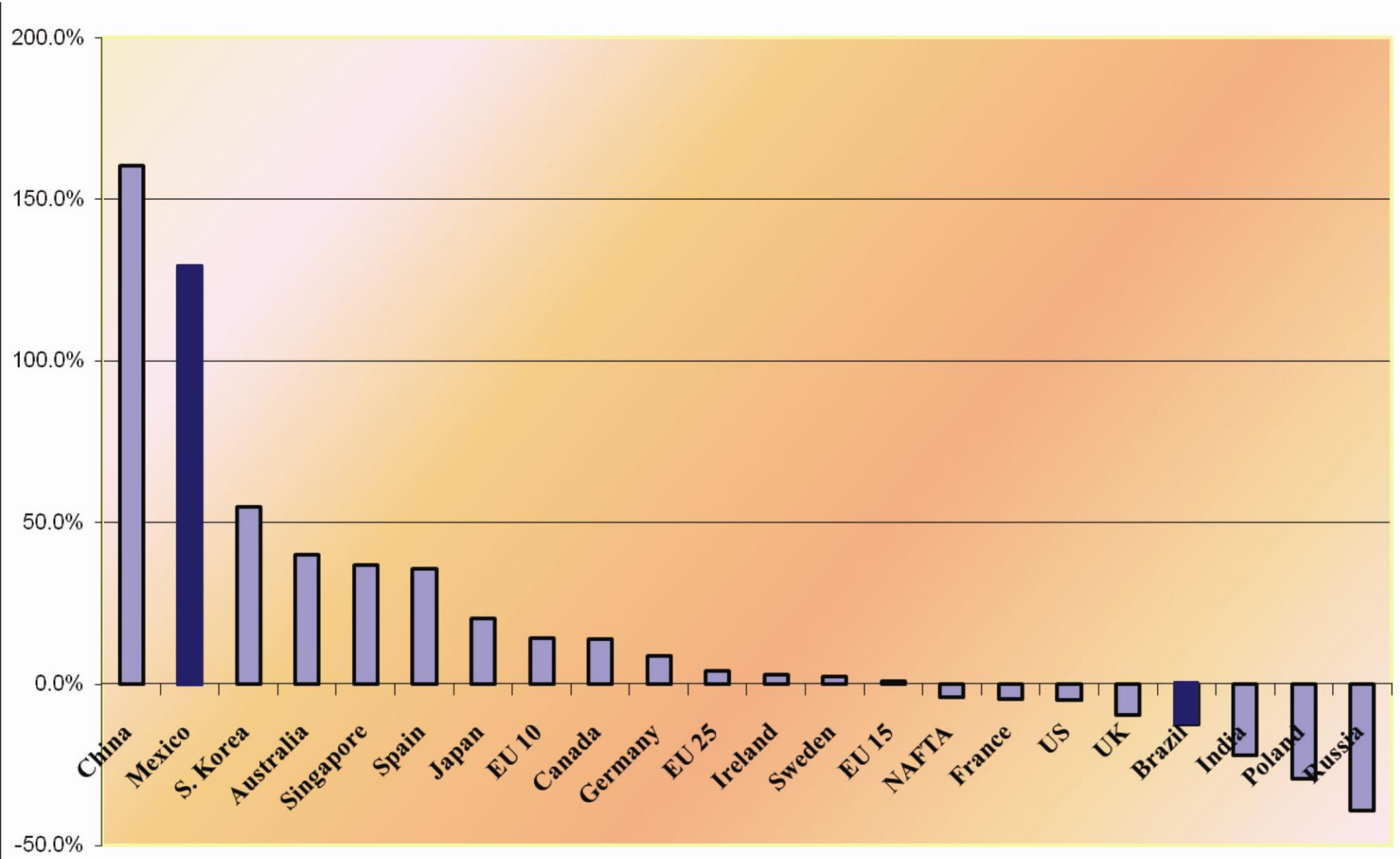
Researchers Change: 1999-2005



Corporate R&D



Corporate R&D Change: 2003-2007



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Some Comforting, But Misleading, Beliefs

- **We cried wolf in the 50's and 80's. We are doing the same now.**

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- **Green is the savior.**

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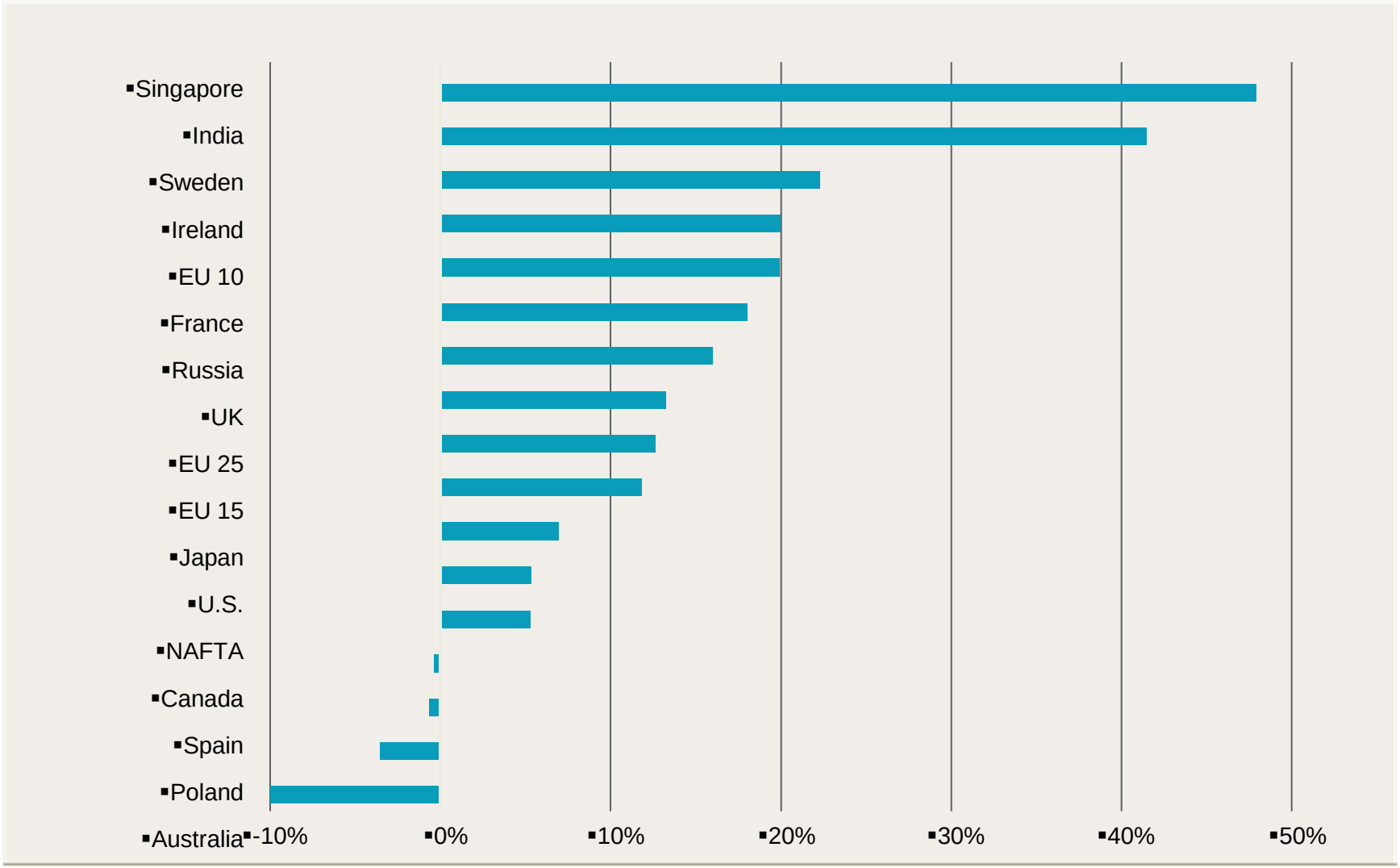
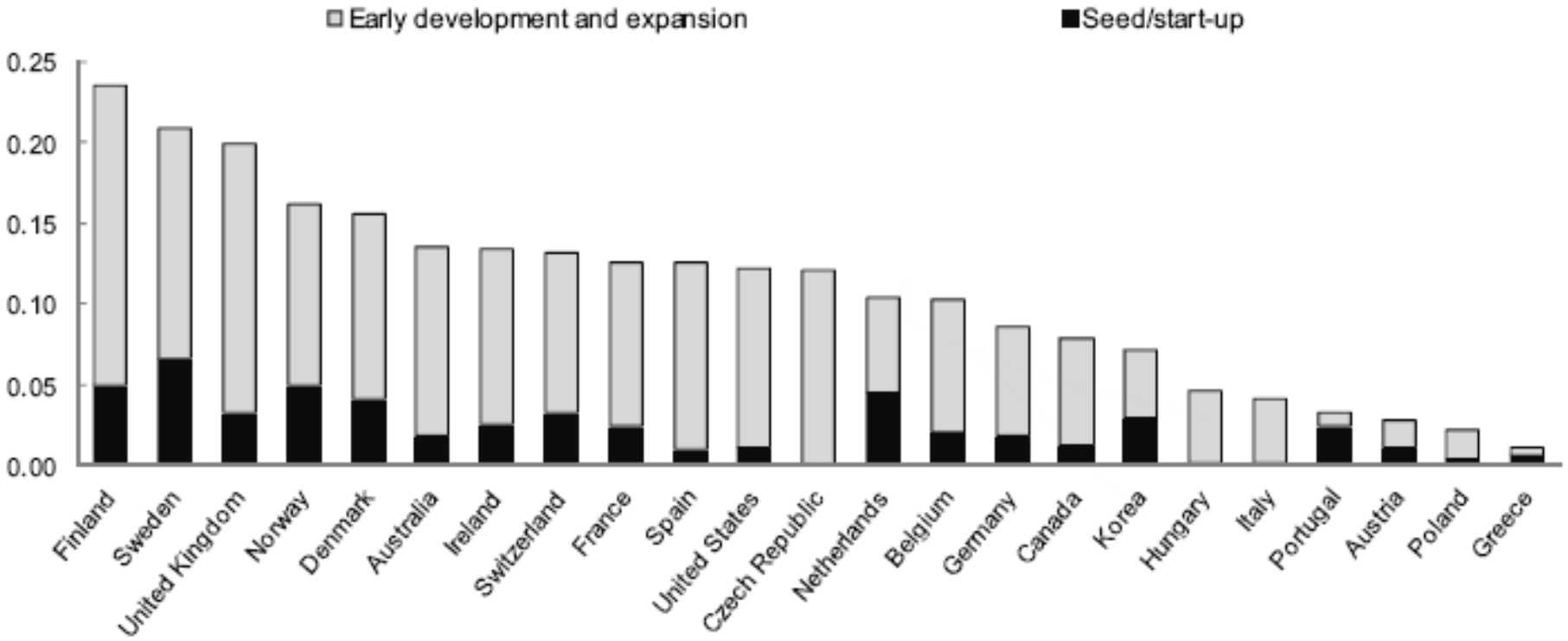
- **Our entrepreneurialism will save us.**

New Firm Change: 2003–2005



Venture capital investments, 2008

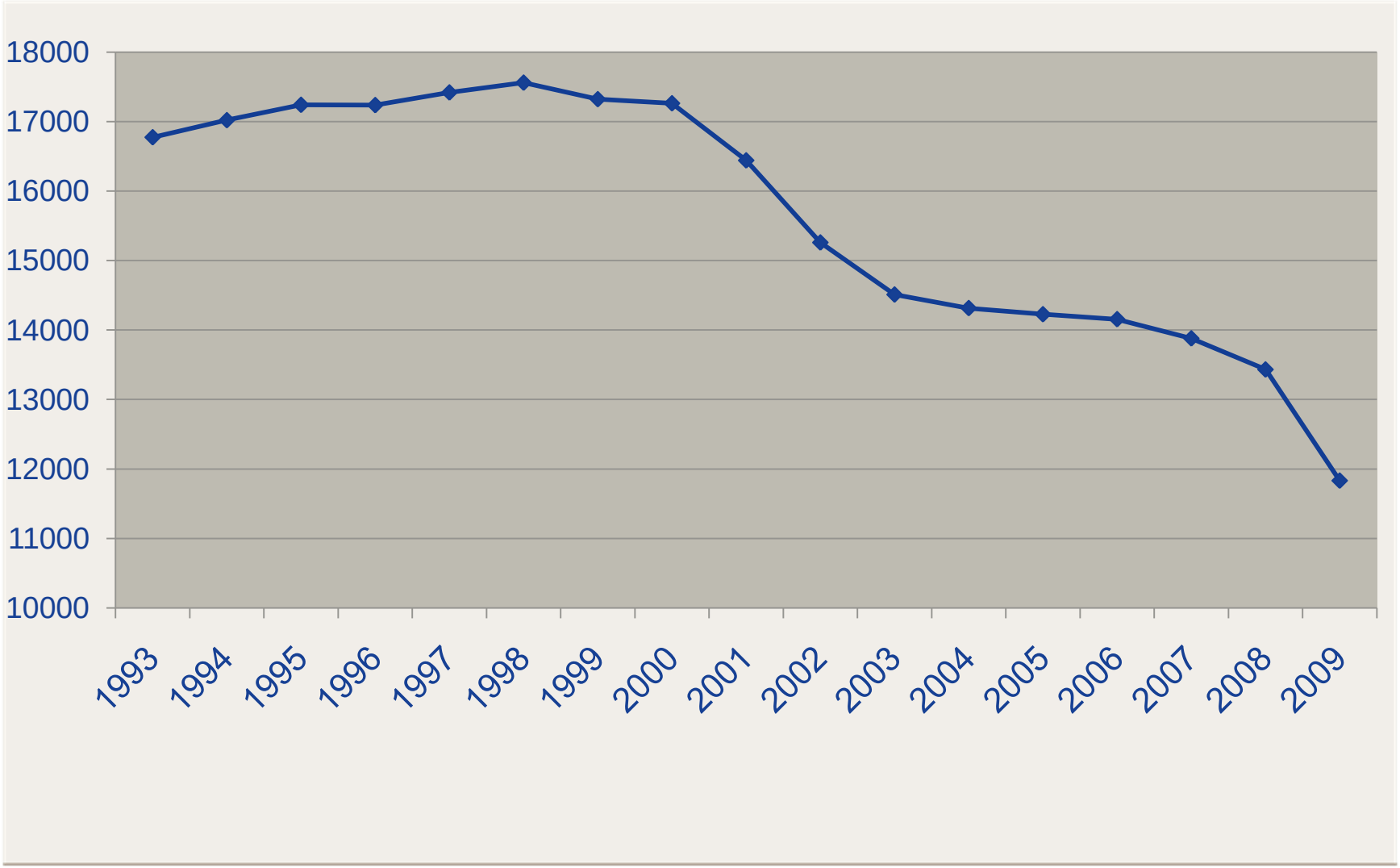
As a percentage of GDP



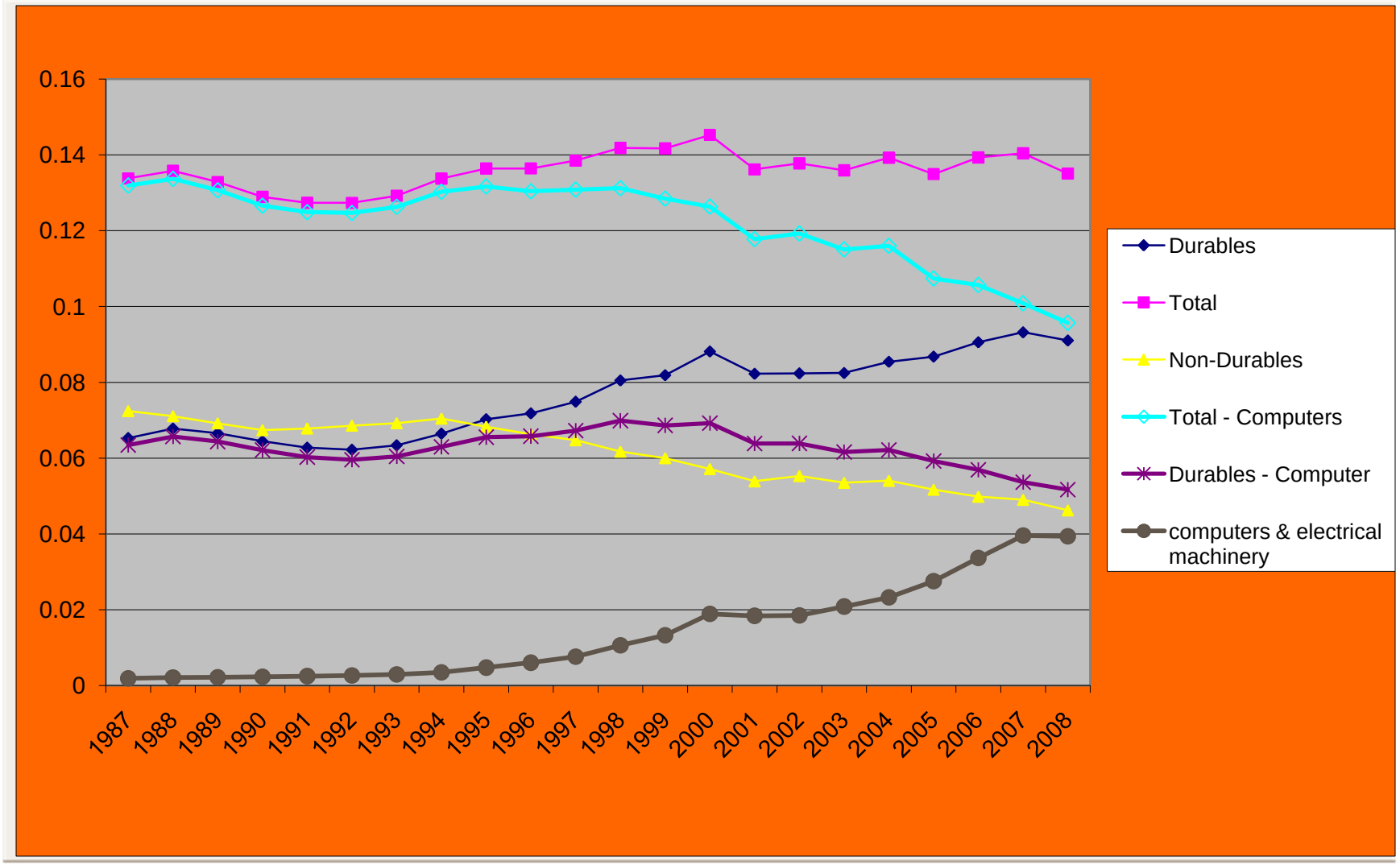
Some Comforting, But Misleading, Beliefs

- We cried wolf in the 50's and 80's. We are doing the same now.
- Green is the savior.
- Our entrepreneurialism will save us.
- **Manufacturing output is actually up, job loss is just from productivity.**

U.S. Manufacturing Jobs Have Declined



Partly Because Manufacturing Value Added Has Declined



Decline of U.S. Manufacturing Industries

	U.S Share Global Manufacturing		Chinese Share Global Manufacturing	
Industry	**Late 90s**	**2008**	**Late 90s**	**2008**
Printed circuit boards	29% (‘98)	8%	7% (‘98)	31.4%
Photovoltaics (solar)	30% (‘99)	5.6%	1% (‘99)	32%
Semiconductors	23% (‘95)	17%		
Semi fab. plants under construction		8%		40%
Passenger vehicles	14.5% (‘99)	7.5%	1.5% (‘99)	12.7%
Machine tools		5.1%		35%

Some Comforting, But Misleading, Beliefs

- We cried wolf in the 50's and 80's. We are doing the same now.
- Green is the savior.
- Our entrepreneurialism will save us.
- Manufacturing output is actually up, job loss is just from productivity.
- **China isn't entrepreneurial.**

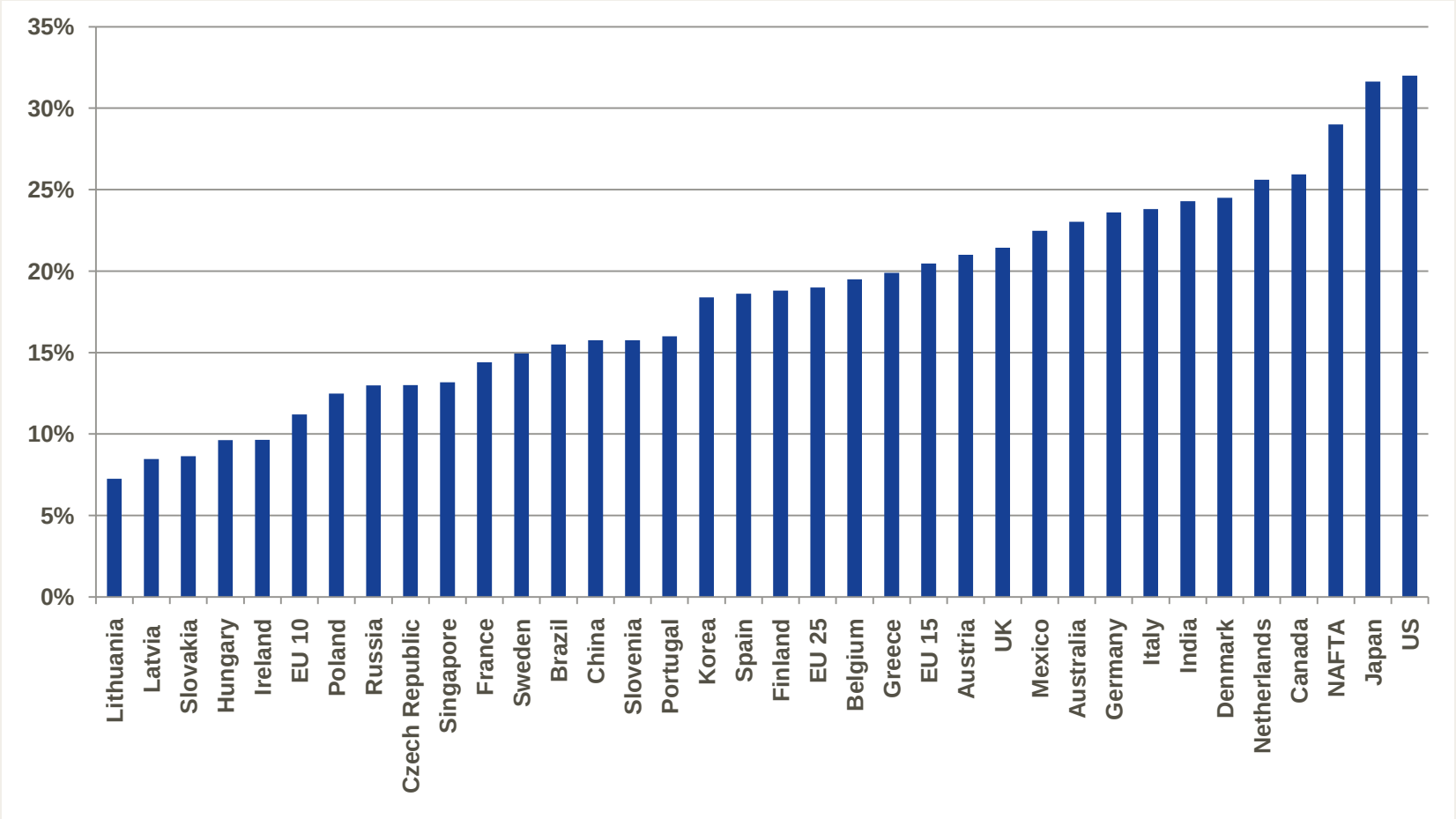
Why Have We Lost Our Lead?

- Other countries acted, we haven't.

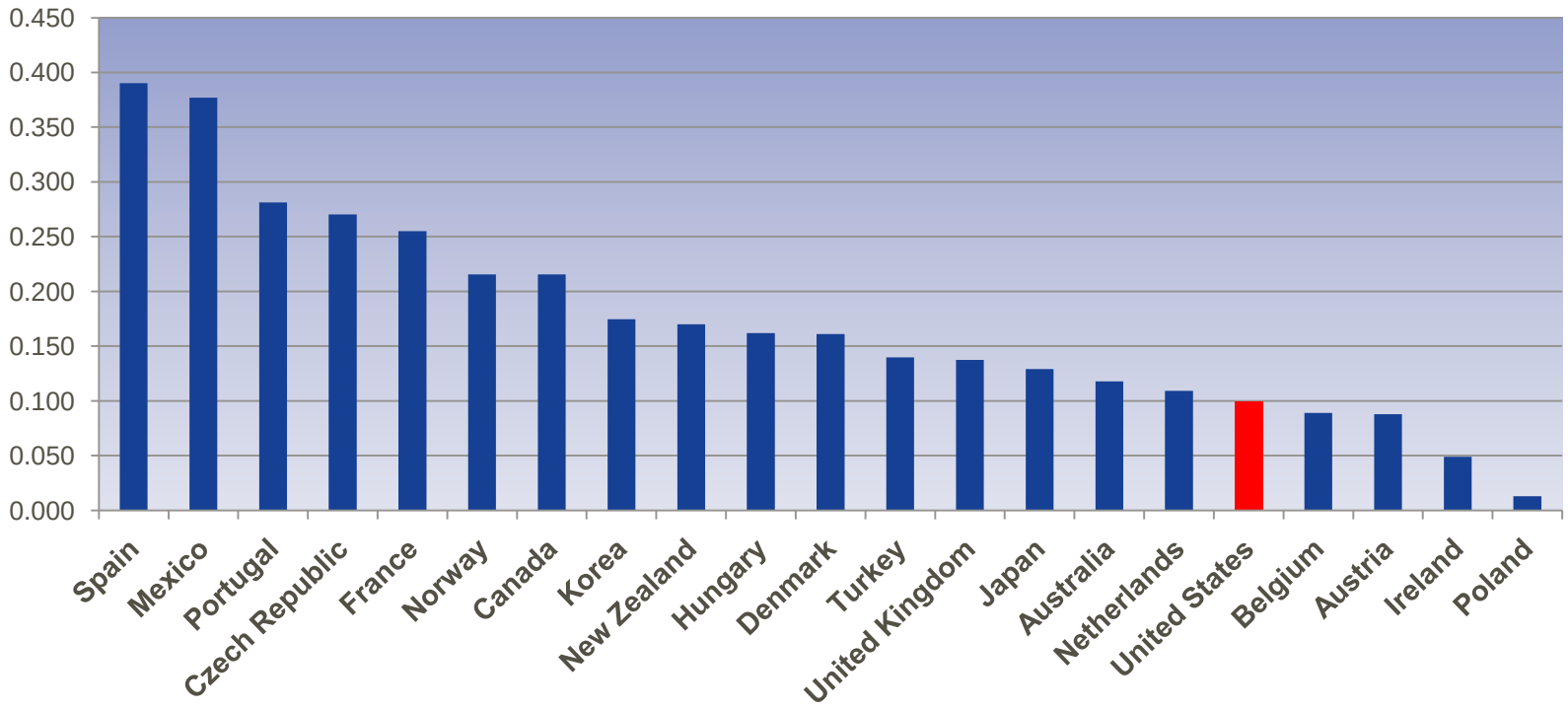
Outside: Innovation Policies

Country	Existence of National Innovation Foundation (s) or Agency	Definitively Articulated National Innovation Strategy/Policy	Stated Commitment to Lead the World in Transitioning to a Digital Economy	Implemented a National Broadband Strategy
Denmark	Yes	Yes	Yes	Yes
Finland	Yes	Yes	Yes	Yes
Ireland	Yes	Yes	Yes	Yes
Japan	Yes	Yes	Yes	Yes
The Netherlands	Yes	Yes	No	Yes
Portugal	Yes	Yes	No	Yes
Singapore	Yes	Yes	Yes	Yes
South Korea	Yes	Yes	Yes	Yes
Sweden	Yes	Yes	Yes	Yes
United Kingdom	Yes	Yes	No	Yes
United States	**No**	**Yes**	**No**	Yes

Effective Corporate Tax Rates, 2008



R&D Tax Generosity for OECD Nations



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Getting Back on Track: the Case for a National Innovation Policy

What is a National Innovation Strategy?

- *"Those elements of science, technology, and economic policy that explicitly aim at promoting the development, spread, and efficient use of new products, processes, and services."*

- A well-conceived, strategic approach that proactively anticipates and articulates the interactions among policies in science and technology, R&D, education, workforce training, immigration, tax, trade, intellectual property, and digital infrastructure investments in driving innovation to create social and economic welfare.

Why Do Nations Need an Innovation Strategy?

1. Because technological innovation drives long-run economic growth.
   - Up to 90 percent of per-capita income growth stems from innovation.
   - The use of information technology has accounted for over half of U.S. productivity growth over the last 15 years.

Why Do Nations Need an Innovation Strategy?

1. Because technological innovation drives long-run economic growth.

2. Because addressing complex and systemic challenges–such as achieving affordable health care, combating global climate change, achieving sustainable energy production, deploying digital infrastructure, etc.–requires coordinated strategies leveraging the resources of firms, government, academia.

Why Do Nations Need an Innovation Strategy?

1. Because technological innovation drives long-run economic growth.

2. Need to address complex and systemic challenges.

3. Because, in contrast to what the conventional neo-classical economic doctrine holds, markets alone will produce societally sub-optimal levels of innovation. Systemic market failures around innovation include:

   - High levels of risk
   - Time horizons
   - System interdependencies (e.g. chicken or egg)
   - Externalities (e.g. spillovers from research)
     - Private RoR from R&D is 7%; but the RoR to society from R&D is 28%
   - Need for technology platforms

Why Do Nations Need an Innovation Strategy?

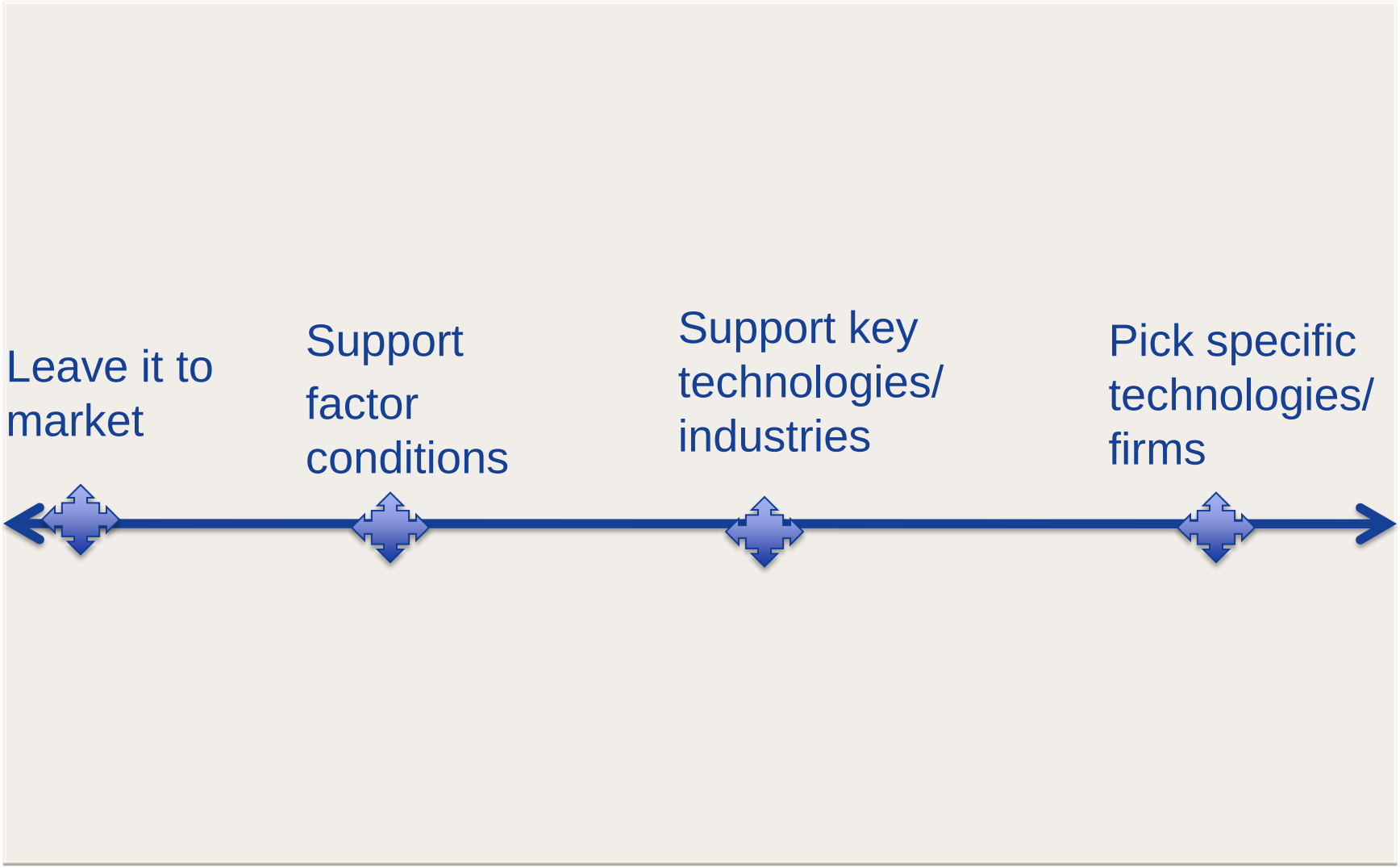
1. Because technological innovation drives long-run economic growth.

2. Difficulty in addressing complex and systemic challenges.

3. Markets alone do not produce societally optimal levels of innovation.

4. Because the stakes have been raised.
   - Globalization means that more of an economy's economic activity is traded and at risk of foreign competition.
   - Other countries are conscientiously targeting the highest-value added sectors of economic activity.
   - Two dozen countries now have formal innovation strategies.

Should Government Pick Winners?



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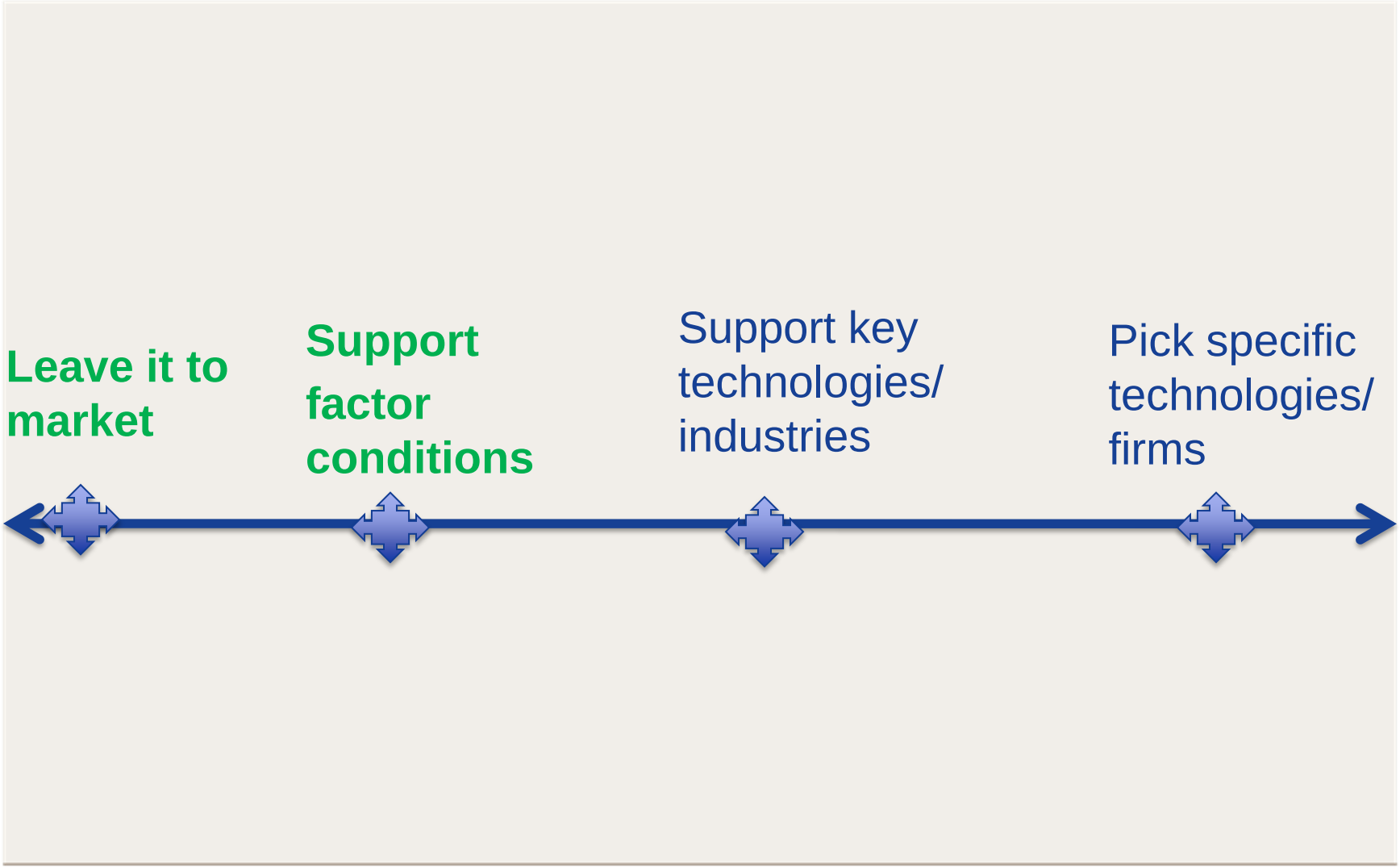

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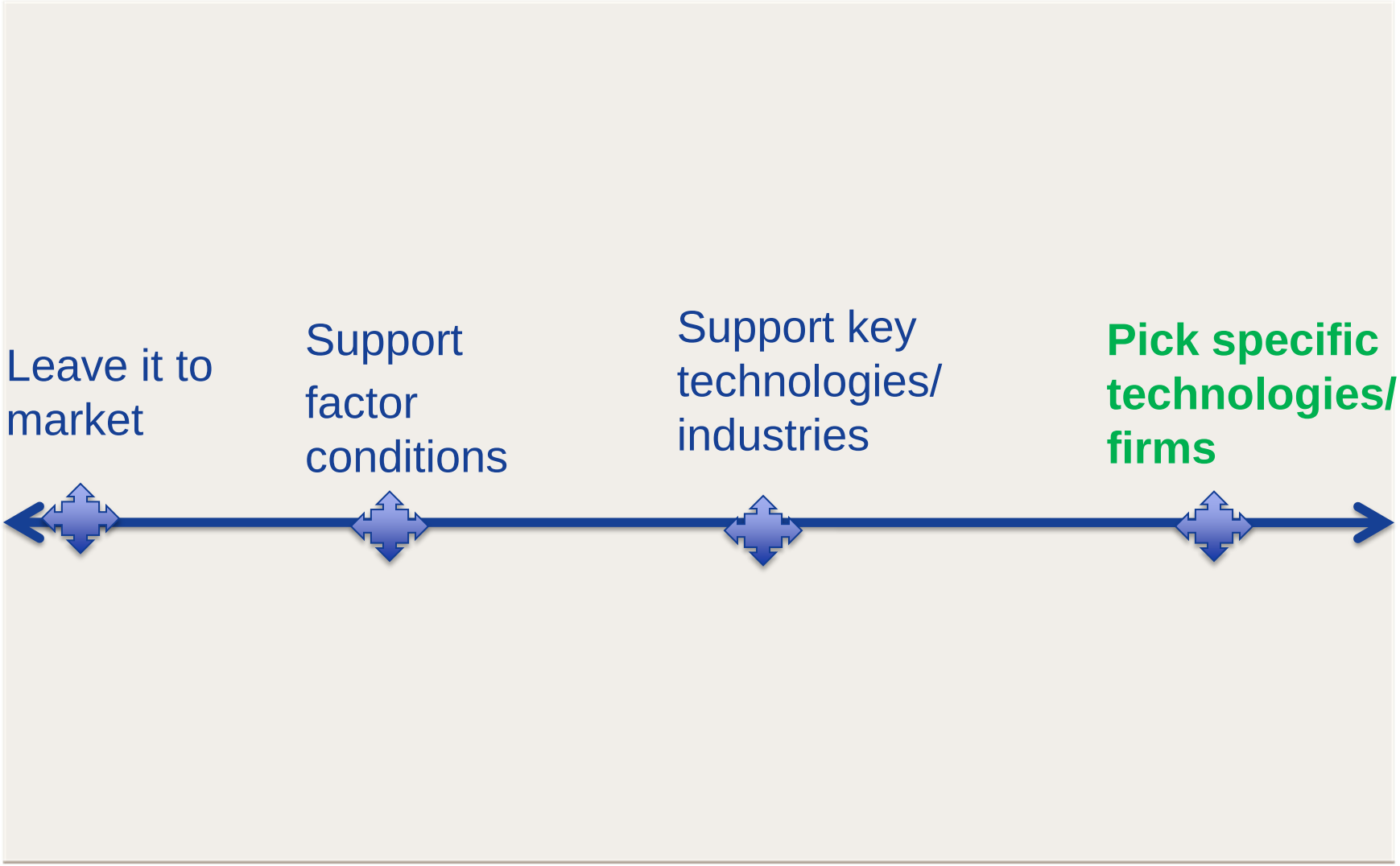

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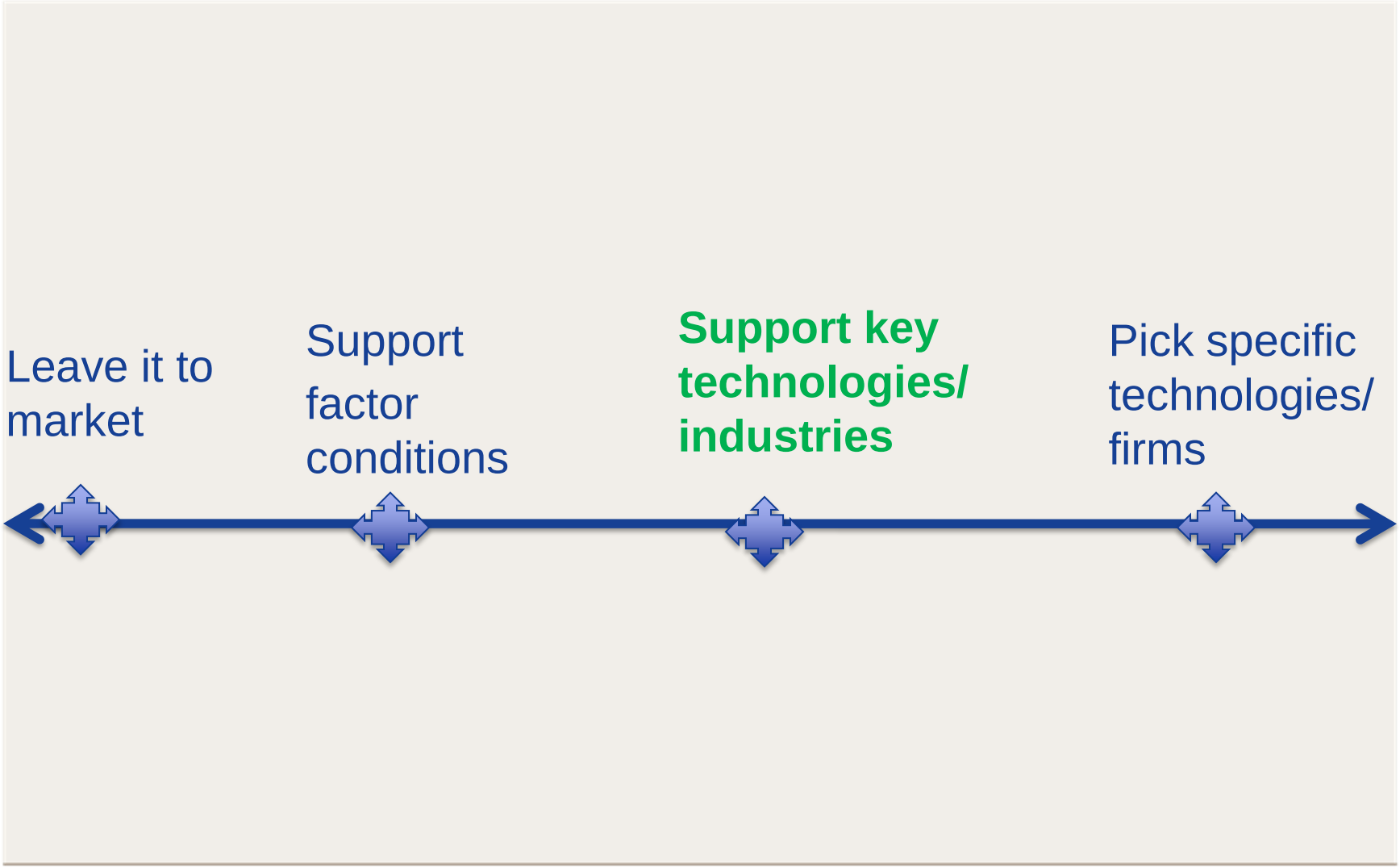

Developing a National Innovation Strategy

1. Support factor conditions
   - Research funding
   - Education and skills, including high skilled immigration
   - College quality: 39 percent of 24 year college grads aren't fully literate, much less fully logical, analytical, creative and collaborative (Role of New College)

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2. Support an innovation environment
   - Tax policy (e.g., R&D tax credit, Internet tax moratorium)
   - Performance-based regulation

Developing a National Innovation Strategy

3. Foster institutional arrangements to spur innovations.
   - $ for Fed-state TBED partnerships
   - Sector-based industry-university-government research partnerships.
   - Championing innovation in the public sector.

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4. Support innovation platforms.
   - Sectors (e.g,, health IT, smart grid, Intelligent Transportation Systems, housing, education
   - Functions (e.g., digital identification, mobile payments)
   - Technologies (e.g., robotics, green energy, expert systems; genomics and proteomics).

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5. Build federal capabilities
   - National Innovation Foundation
   - Office of Innovation Review
   - Innovation in Innovation policy
   - Better national and regional innovation metrics.

Develop an International Innovation Strategy

- Shortcuts to growth – export led mercantilism. Mercantilism is designed around the view that exports are better than imports.

- Distorting mercantilism is designed as promoting trade surpluses through a variety of negative-sum activities, such as:
  - Pricing under cost (dumping, subsidies, currency; limiting unions);
  - Limiting imports (closed markets, forced offsets; standards, manipulation, IP theft).

- Countries will do this unless there are rules that impose costs on their actions.

- Today's global bodies (World Bank, IMF, WIPO, WTO, AID, Ex-Im Bank, etc.) often turn a blind eye to these practices.

Why the U.S. Hasn't Had a National Innovation Strategy

1. **We don't need to.**
   - We've always been ahead and we always will be. We have unlimited resources, better entrepreneurs, more technology, etc.
   - Besides, nations don't compete, only companies do.

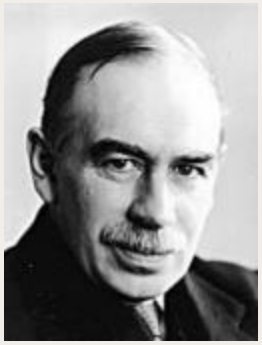
2. **Private markets do just fine for us by themselves alone.**
   - IBM, Google, Oracle, Akamai, the Internet (ARPANET), Mosaic web browser, others all arose directly from government research funds or grants.
   - And if you don't have those, you don't get the Amazons, e-Bays, etc.

3. **Dominant economic doctrines say there's no role for government.**
   - Neo-classical and neo-Keynsian vs. innovation economics.
   - Innovation is seen as "Manna from Heaven."

Three Dominant Economic Policy Doctrines

Rubinomics

Policymakers



Neo-Keynesian Economics

Supply-side Economics

The New Kid on the Block – Innovation Economics

- Puts innovation at center of economic policy,
- Maximizes growth with proactive and strategic public policies to spur innovation.

www.innovationeconomics.org

Neo-Classical Economics vs. Innovationomics

≠

- Farm subsidies do NOT equal investments in TBED
- Tight budgets should not be an excuse for limited investment in innovation

So, Will the U.S. Be Boston or Buffalo?

Reasons for Buffalo:

- We have become a risk averse society that views innovation and progress with fear and loathing.
- We have become more concerned with protecting, preserving, and redistributing our previously accumulated wealth than growing it anew.
- We seem unable to summon any kind of centrist, moderate pro-market, pro-government policies.
- Our foreign policy is largely focused on military, not economic issues.
- We have no money.

So, Will the U.S. Be Boston or Buffalo?

Reasons for Boston.

- We still have a creativity and risk-taking mentality that other nations, especially Asia, don't.
- We lead on IT companies and IT use in companies.
- Current administration is focusing on this and there is a growing realization in Washington that we have to act.
- It takes us time: As Churchill famously stated, "you can always count on the Americans to do the right thing… after they have exhausted all the other possibilities."

Thank you

ratkinson@itif.org
www.itif.org